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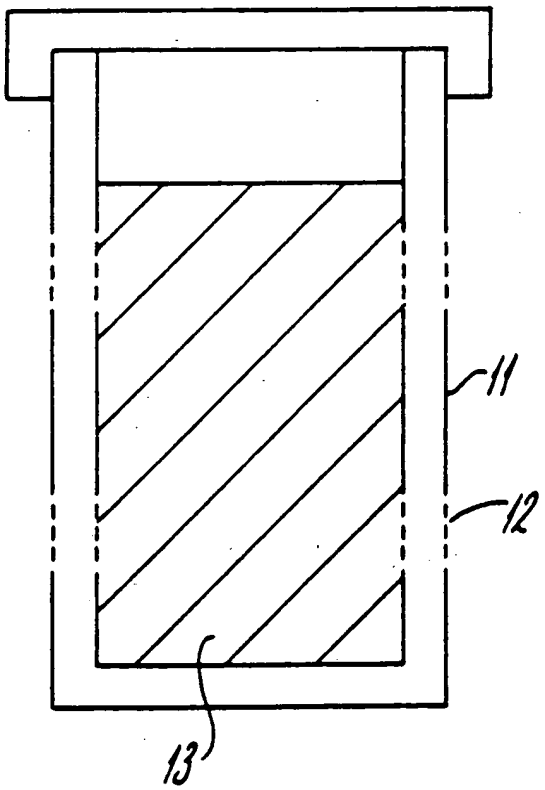
(54) Rumen bolus of soluble glass

(57) A rumen bolus for supplying a mineral supplement to a ruminant animal comprises a water soluble glass incorporating the mineral and contained in an inert insoluble housing, (e.g. of plastics material), having a plurality of apertures for dissolution of the glass. Typically the glass is in the form of tubes or pellets so as to provide a substantially constant dissolution rate.



SPECIFICATION

Rumen Bolus

This invention relates to the intraruminal delivery of mineral supplement to ruminant animals and to a rumen bolus for such delivery.

It has been found that the delivery of mineral supplements to ruminant animals, e.g. sheep and cattle, results in increased growth rate and improved health of the animals. It has been proposed to provide such a mineral supplement from a soluble bolus, e.g. of a water soluble glass, which lodges in the rumen of the animals and slowly dissolves to release the minerals. The surface area of such a device reduces with time and thus the release rate of the mineral also decreases. Further the casting and annealing operations involved in the manufacture of a large bolus are time consuming and thus result in a relatively high manufacturing cost.

The object of the invention is to minimise or to overcome these disadvantages.

According to the invention there is provided a rumen bolus for the delivery of a mineral supplement to an animal, said bolus including an insoluble housing having a plurality of openings and containing one or more bodies formed from a water soluble glass incorporating the mineral supplement.

An embodiment of the invention will now be described with reference to the accompanying drawing in which the single Figure is a vertical view of the rumen bolus.

Referring to the drawing, the bolus comprises a housing 11, e.g. of a plastics material, having a plurality of openings 12. Typically the housing comprises a plastics mesh, but it may also comprise a rigid container provided e.g. with a snap-on lid. The housing 11 contains one or more bodies 13 each comprising a water soluble glass incorporating a mineral supplement. The bodies 13 may comprise granules, or, advantageously, platelets or tubes. The latter two forms are to be preferred as their surface configuration provides a substantially constant dissolution rate. Where platelets are employed there are typically 5 to 10 mm in diameter and 1 to 3 mm in thickness.

The glass contains the mineral to be released e.g. in the form of an oxide. Typically the glass incorporates copper as a growth promoter. Other minerals include, but are in no way limited to, iron and cobalt as feed supplements, and selenium for connection of mineral defficiency. Advantageously the bolus contains a plurality of glass compositions in pellet form, the mix being predetermined, e.g. by veterinary diagnosis, for the particular animal to which the bolus is to be administered. Compositions of differing dissolution rates may also be employed to provide variation in the composition of released minerals over an extended period.

A number of water soluble glasses may be used for this purpose. Typical of such compositions are those described in our published specifications No. 2030559 (C. F. Drake-64); 2037735 (C. F. Drake-M. Tripp 68-2, and 2081703 (C. F. Drake-M. Tripp 72-3).

The technique is not of course limited to these compositions. Furthermore one or more organic materials may also be incorporated in the bolus e.g. to provide for the release of an anthelmintic or of an antibiotic. The bolus may also incorporate glass/polymer composite structures such as are described in our published specification No. 2 111 388 (C. F. Drake-R.Jones 83-3).

A typical glass for supplying copper comprises

28.2	mole %	CuO
25.0	mole %	Na_2O
41.8	mole %	P_2O_5
5.0	mole %	ZnO

This is equivalent to 17.6 wt % copper.

This glass was prepared by melting the following constituents for one and a half hours at 1100°C in an oxidising atmosphere:—

$Cu_2P_2O_7 3H_2O$	601 g
$Zn_3(PO_4)_2 22H_2O$	85.5 g
$NaHPO_4$	715.5 g
P_2O_5	30 g

The weight loss during melting was 200 g.

The melt was cast on to a chilled steel plate, crushed and then smelted at 1050°C. This melt was cast into a pellet mould and annealed from 335°C to ambient temperature over a period of 15 hours. The pellets thus produced had a diameter of 11 mm and a thickness of 2.8 mm. The in vitro dissolution rate measured in deionised water at 38°C was 1.58 mg Cn/pellet/day which is equivalent to 0.6 mg Cn/cm^2/day. Such a dissolution rate is appropriate for the supply of copper to a ruminant animal.

It will be appreciated by those skilled in the art that, because of the unpredictable manner in which some metal oxides and certain oxide combinations can effect glass dissolution rates, it may be difficult or impractical to provide a conventional solid glass bolus that will release a plurality of minerals each at the optimum rate for animal therapy. This disadvantage of a conventional bolus can be overcome using the techniques described herein by providing, in a single bolus construction, a plurality of glass compositions each designed to release a particular element or elements at a rate corresponding to the nutritional requirements of an animal to which the bolus is administered.

CLAIMS

1. A rumen bolus for the delivery of a mineral supplement to an animal, said bolus including an insoluble housing having a plurality of openings and containing one or more bodies formed from a water soluble glass incorporating the mineral supplement.

2. A bolus as claimed in claim 1 wherein said housing contains a plurality of glass compositions.

3. A bolus as claimed in claim 1 or 2, wherein the glass is in the form of platelets.

4. A bolus as claimed in claim 3, wherein said platelets are 5 to 10 mm in diameter and 1 to 3 mm in thickness.

5. A glass as claimed in claim 1 or 2, wherein the glass is in tubular form.

6. A bolus as claimed in any one of claims 1 to 5, wherein said glass contains copper.

7. A bolus as claimed in any one of claims 1 to 6, wherein said glass contains selenium, iron, cobalt or mixtures thereof.

8. A bolus as claimed in any one of claims 1 to 7 and further including an organic material.

9. A bolus as claimed in claim 8, wherein said organic material comprises an anthelmintic.

10. A bolus as claimed in any one of claims 1 to 7, wherein said glass is incorporated in a glass/polymer composite.

11. A bolus as claimed in any of claims 1 to 10, wherein said housing comprises a plastics mesh.

12. A body as claimed in any one of claims 1 to 10, wherein said housing comprises a rigid body with a snap-on lid.

13. A rumen bolus substantially as described herein with reference to the accompanying drawing.

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